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While considering the theory of Professor Powell's bands, the author was led to perceive the explanation of certain bands, described by Professor Powell, which are seen in the secondary spectrum formed by two prisms which produce a partial achromatism. Although the account of these bands has been published many years, they do not seem hitherto to have attracted attention. It is easily shown by common optics that when two colours are united by means of two prisms, the deviation, regarded as a function of the refractive index, the angle of incidence being given, is a maximum or minimum for some intermediate colour. For the latter colour, two portions of light of consecutive degrees of refrangibility come out parallel; and therefore the diffraction bands belonging to different kinds of light, of very nearly the same refrangibility with the one in question, are superposed in such a manner that the dark and bright bands respectively coincide. Thus distinct bands are visible in the secondary spectrum, although none would be seen in the spectrum formed by a single prism, in consequence of the mixture of the bright and dark bands belonging to different kinds of light of nearly the same degree of refrangibility. The diffraction bands here spoken of are of very sensible breadth, in consequence of the small width of the aperture employed in the actual experiment.

When a spectrum is viewed through a narrow slit half covered by a plate of mica, the edge of which bisects the slit longitudinally, and is held parallel to the fixed lines of the spectrum, the bands described by Sir David Brewster are seen, provided the mica plate lie at the side at which the blue end of the spectrum is seen, and provided the thickness of the plate and the breadth of the slit lie within certain limits. When these bands are invisible in consequence of the slit being too narrow, or the spectrum too broad, it follows from theory that the bands ought to appear when the slit and plate are turned round the axis of the eye, so that the edge of the plate is no longer parallel to the fixed lines of the spectrum. The author has verified this conclusion by experiment, employing plates adapted to observations with the naked eye, which are best suited to the purpose.

February 1, 1849.

GEORGE RENNIE, Esq., Treasurer, Vice-President, in the Chair.

The following paper was read :—"On the Chemistry of the Urine;" in three Parts. By H. Bence Jones, M.D., M.A., F.R.S.

Part I. *On the variations of the Acidity of the Urine in Health.*

The mode of examination adopted by the author was the following : Two test solutions were made ; the one with carbonate of soda ; the other with dilute sulphuric acid, of such strength that each measure of a graduated tube, when filled with either solution, was equivalent to one-twelfth of a grain of dry and pure carbonate of soda.

A weighed quantity of urine was neutralized by one or other of

the test solutions, and thus the degree of acidity or alkaliescence was determined.

Diurnal variations in the acidity of the urine were observed. The acidity of the urine was found to ebb and flow ; it was greatest a short time before food was taken, and was least about three hours after breakfast, and five or six hours after dinner, when it reached the minimum point ; after which it again increased, and attained the maximum point previous to food being again taken.

If no food was taken, the acidity varied but slightly for twelve hours.

By comparing the effect of vegetable food with animal food, it appeared that the food which irritated the stomach most and caused most secretion of acid in the stomach, caused the greatest oscillations in the urine.

Dilute sulphuric acid taken in large doses produced but little effect on the variations of the acidity of the urine ; but it was proved to increase the acidity of the urine.

Part II. *On the simultaneous variations of the amount of Uric Acid and the Acidity of the Urine in a healthy state.*

The result of these experiments is, that there is no relation between the acidity of the urine and the amount of uric acid in it. The urine that was most acid contained least uric acid ; that which contained most uric acid was not most acid. All food causes an increase in the amount of uric acid in the urine ; and there is no decided difference between vegetable and animal food, either as to the increase or diminution of the amount of uric acid in the urine.

Part III. *Variations of the Sulphates in the Urine in the healthy state, and on the influence of Sulphuric Acid, Sulphur and the Sulphates, on the Sulphates in the Urine.*

The result of these experiments is, that the sulphates in the urine are much increased by food, whether it be vegetable or animal. Exercise does not produce a marked increase in the sulphates. Sulphuric acid, when taken in large quantity, increases the sulphates in the urine. In small quantity, even when long-continued, no effect on the amount of sulphates is manifest.

Sulphur taken as a medicine increases the sulphates in the urine. Sulphate of soda and sulphate of magnesia produce the most marked increase in the sulphates in the urine.

February 8, 1849.

The EARL OF ROSSE, President, in the Chair.

A paper was read, entitled "On the application of the Theory of Elliptic Functions to the Rotation of a Rigid Body round a Fixed Point." By James Booth, L.L.D., F.R.S.

In the introduction to his investigation, the author, after noticing the investigations of D'Alembert and Euler, and the solution of this